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On the pathological side, G. finds two classes of disturbances arising from impairment of the optical element and of the motor element. Under the former he cites left-handed writing, which is sometimes symmetrical with right-hand (*spiegelschrift*—from right to left), and sometimes a reproduction of the copy by the same movement as the right hand (from left to right). The former "mirror-writing," he thinks is due to the tendency to symmetrical innervation of the two arms when one of them is practiced (*Mitbewegung*). It is possible only in as far as the optical "copy" image is thrown into the background or suppressed. The latter is due to the strength of this optical image in bringing both hands to the reproduction of itself. The motor disturbances of hand writing are also of two kinds, giving "trembling" (*Zitterschrift*) and "tortic" writing. The peripheral cause of the latter is impairment of any of the "control" series, visual, movement (joint), or pressure and resistance sensations. The central causes of disturbance he discusses in another paper (*Berliner klin. Wochenschrift*, 1892).

J. M. B.

*Ein deutsches Gelehrtenleben von Prof. Dr. jur. J. E. Kuntze.* GUSTAV THEODOR FECHNER. Leipzig, Breitkopf and Härtel, 1892, pp. 372.

The author of this volume is a nephew of Fechner's, and was for many years a member of his household.

Gustav Theodor Fechner was born in 1801 at Grossärchen, where his father had succeeded his grandfather as pastor of the church. His grandfather had won education and position by persistent struggle with poverty and discouragement, and his memory is still held in honor in the town where he lived as pastor over forty years. His father was remarkable for his independent and progressive spirit, which made him a leader among his people in matters of public utility as well as things spiritual. His mother was the daughter of a pastor, a woman of unusual force and sweetness of character. She was early left a widow in straitened circumstances with five little ones to bring up. The two boys were sent to an uncle, who provided for them for several years. In 1815, Frau Fechner was able to settle in Dresden, and the family was reunited for a short time. In 1817, Fechner entered the University of Leipzig to study medicine. He found most of the lectures he had planned to hear so unsatisfactory that he attended but two or three courses. Indeed, this dissatisfaction, combined with his distrust of the methods practiced in the profession, resulted in his giving it up altogether. He took the regular doctor's degree of the university, but devoted himself more and more to literary pursuits and scientific investigations. Even while studying in Dresden, he had partly met the expenses of his education by giving lessons and translating, and by these means he now earned sufficient for self-support. It was about this time (1820) that he read the first chapter of Oken's *Naturphilosophie*, which, to quote his own words, "so inspired me as to determine the direction of my mind for many years to come." To it he owed his escape from the atheism his medical studies had induced, and the permanent gain of the conception of all nature as a living unity.

In 1824 his mother and sisters joined him in Leipzig, and henceforth his home was with them until his marriage. He continued his translations from French scientific works, with voluminous additions of his own, and wrote besides many original papers on subjects connected with physics. To this period belong also his satires, which he published under the *nom de plume* of Dr. Mises. They are

marked by clear and admirable style, exuberant fancy and scathing wit, which spares neither philosophy, medicine, tradition nor convention. In the "Beweis dass der Mond aus Iodine besteht," as well as in some of the others, he gives humorous expression to the causes of his distrust of the methods then in vogue in medicine. In "Die vergleichende Anatomie der Engel" there are hints of conceptions later worked out more fully in "Nanna" and "Tend-Avesta." He began his lectures on physics at the university in 1824, and in 1834 received a full professorship. He had the most deep-seated distaste for any official restraint upon his intellectual life, and had only yielded to the solicitations of his friends in seeking the position to which he was finally appointed. A short time before he had married Fräulein Clara Volkmann, who proved a most faithful and devoted wife and companion, and who still survives him. The next six years were crowded with work, which Fechner felt obliged to pursue unremittingly, because of unavoidable family claims upon him for material aid. The crisis of his life was a natural result of this prolonged strain. In 1840 he gave signs of a complete nervous collapse, accompanied by severe head and eye troubles, which, for a time, completely disabled him. He has left a detailed account of this illness, believing that it may be of interest and service to others. The beginning of his gradual restoration to health of mind and body reads like the story of some miracle. Slowly but surely the improvement went on, and about 1843 he was once more able to resume his accustomed life and work with the joy and vigor of one risen from the dead.

During his illness a pension had been assigned him by the university, and although he never again assumed his former position, he gave voluntary lectures on the relations between mind and body for many years. He was not popular as a lecturer, except with a chosen few, for the average student craved instruction given on more limited lines than those on which his mind naturally worked.

Fechner's illness made the one serious interruption to his life-long intellectual activity. After his recovery he was able to devote himself to philosophic and scientific research and production for more than forty years. To his period belong his best known and most important works. It seems appropriate that the detailed exposition of his system of philosophy should be among the first fruits of this time. In 1848 "Nanna" appeared, and in 1851, "Tend-Avesta." In both of these he urges with eloquence and force the ground for his belief in that higher pantheism which was his deepest personal conviction. In nothing that he has written does he give greater evidence of his freshness and originality as a thinker, as well as of his rare literary gifts. His best-known contribution to science, the great work on "Psychophysik," appeared in 1860, and proved him a master in the new field, which had been but recently opened up. Wundt says "Fechner was the first to recognize the extent and significance of the investigations of Weber, and to him is due the creation of those exact methods without which further progress would have been impossible." The period of Fechner's interest and work in æsthetics, which now followed, is described by his biographer as a parenthesis. He threw himself into the subject with that ardor which characterized him in everything he undertook. His "Vorschule der Ästhetik" was the final exposition of his views, and in it he establishes a scientific basis for some of the fundamental ideas of beauty. The labor of his last years was chiefly given to the revision and strengthening of his work in "Psychophysik." Old age found him with unabated mental freshness and vigor. He was at work until his usual hour the evening that he

was taken ill. He lingered a few days, unconscious for the most part, but whenever he revived, his mind was perfectly clear. He fell quietly asleep, Nov. 18. 1887.

This life shows us a man endowed with a rare combination of qualities, both moral and intellectual. Simple and kindly as a child, indifferent to luxury—his one extravagance was in the matter of writing material—brave and patient in suffering, and afraid of nothing but idleness, of genuine piety and purity of life, he might almost have passed for a saint had he not been so remarkable as a scholar. Possessed of unusual independence, originality and versatility of mind, he yet had infinite patience in mastering subjects in themselves distasteful to him. Great as was his productiveness he did not write easily, and all his work represents painstaking revision and correction. Modestly conscious of his own powers, it is not strange that he was disappointed at the comparatively small recognition with which his philosophical system had met. Content with no subject until he had brought it into some sort of unity with his conception of the whole, he could ill understand the ability of many men to hold confused and inconsequent views. He was a true son of his people in his passion for nature, and his deep sense of man's close and intimate relation to it. But he had his limitations. He was distinctly the nature-lover as distinguished from the lover of history and the past. Rome

"A city was to him  
And it was nothing more,"

and he walked its streets far more interested in his own thoughts than anything outside them. For general social life and amusement he cared not at all. His one regular diversion was a weekly chess club, whose meeting he never missed, and he always enjoyed the society of intimate and congenial friends, and was often stimulated by them to discussion and argument, in which he took a keen delight. It is still too early to assign him his final place in the intellectual history of his country, but he is a connecting link between the past and present, and represents that scientific interest in the physical side of mental phenomena which marks a new era in German philosophy. His great aim was to bring about the alliance of speculation and research, and in this good cause he fought loyally to the end.

C. H. S.

*Ueber die Gleichzeitigkeit und Ungleichzeitigkeit von Bewegungen.*"

O. KÜLPE. Phil. Studien, 1891, VI, p. 514, and 1892, VII, p. 124.

Dr. Külpe discusses some experiments in which it was sought to raise both hands simultaneously. The subjects reacted in four ways: ordinary muscular and sensorial reaction, and two unstimulated kinds, one with attention previously concentrated on the movement, as in muscular reaction, and one without special preparation. A bell furnished the stimulus (where necessary) in the first set; only such results were admitted as appeared simultaneous to the subjects. The figures given represent the deviations from simultaneity. In the majority of cases the left hand reacted first. The several subjects and kinds of reaction give widely varying results, but in general the figures for muscular and sensorial show the same relations as in simple reaction, and so do the unstimulated reaction—the average of the so-called "premeditated voluntary reaction" being slightly larger than that of the muscular, and that of the "unpremeditated" rather larger than that of the sensorial.

Looking at reaction from the psychological side, two laws of the association affect its rapidity. First, a period of strained attention